Standards for Interoperability and Data Exchange

Version (2)

Issue date: 02/04/2025

Effective date: 02/07/2025

Health Informatics and Smart health Department

Dubai Health Authority (2025)

ACKNOWLEDGMENT

The Health Informatics and Smart Health Department (HISHD) developed this Standard in collaboration with Subject Matter Experts and would like to acknowledge and thank these health professionals for their dedication toward improving quality and safety of healthcare services in the Emirate of Dubai.

Dubai Health Authority

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INTRODUCTION

Dubai Health Authority (DHA) is mandated by Local Law No. (14) Of 2021 on amending the local Law No. (6) of 2018 concerning the Dubai Health Authority , to undertake several functions including but not limited to:

- Developing regulation, policy, standards, guidelines to improve quality and patient safety and promote the growth and development of the health sector.
- Licensure and inspection of health facilities as well as healthcare professionals and ensuring compliance to best practice.
- Managing patient complaints and assuring patient and physician rights are upheld.
- Governing the use of narcotics, controlled and semi-controlled medications.
- Assuring management of health informatics, e-health and promoting innovation.

The “Standards for Interoperability and Data Exchange” aims to fulfil the following overarching Dubai Health Sector Strategy 2026:

- Pioneering Human-centered health system to promote trust, safety, quality and care for patients and their families.
- Become a global digital health hub.
- Foster healthcare education, research and innovation.

EXECUTIVE SUMMARY

The purpose of this document is to assure the use of proper and standardized interoperability and data exchange to better link and transfer clinical information between Health Information Systems (HIS) in the Health facilities in the Emirate of Dubai. The standards have been developed to align with the evolving health information quality needs and international best practice.

This document should be read in conjunction with other health information governance Documents released by DHA:

- Policy for Health Data and Information Sharing
- Policy for Health Information Assets Management
- Health Data Quality Policy
- Health Data Classification Policy
- Guideline for transition of EMR
- Policy for Health Data Protection and Confidentiality
- Subject of Care Rights
- Consent and Access Control Policy
- Incident Management and Breach Notification policy
- Data Management and Quality Policy (Primary and Secondary Use)
- Health Information Audit Policy
- Identity Management Policy

- Authentication and Authorization policy
- Information Security standard
- Standards for Clinical Data Coding and Terminology
- Technical and Operational Standards
- Artificial Intelligence in Healthcare Policy

DEFINITIONS

Application Programming Interface: is a set of rules or protocols that enables software applications to communicate with each other to exchange data, features and functionality.

Electronic Business XML or e-business XML (EbXML): is a project to use the Extensible Markup Language (XML) to standardize the secure exchange of business data.

Electronic Medical Record (also known as Electronic Health Record): is a systematic collection of electronic health information of an individual in a digital format that conforms to nationally recognized interoperability standards and enables information to be used and shared over secure networks.

Encounter: In relation to a Data Subject/Patient, the period from when that Subject of care is first brought under the care of a Healthcare Professional at a Healthcare Facility until the time that Subject of care ceases to be under the care of a Healthcare Professional at that Healthcare Facility.

Health Facility: DHA licensed health facility that performs medical examinations on patients, diagnosing their diseases, treating or nursing them, admitting them for convalescence, or assuming any activity related to treatment or to rehabilitation after treatment, whether it is owned or managed by natural or juridical persons.

Health Information System (HIS): Systems that collect, store, and process Protected Health Information (PHI) regardless of the owner of the system; for example: Electronic Medical Record (EMR), Health Information Exchange (Nabidh), Claims Management system, Public

health portals, Practice Management Software, Patient Portals, Remote Patient Monitoring (RPM) Also known as telehealth, Laboratory Information System (LIS).

Minimal Lower Layer Protocol (MLLP): defines the leading and trailing delimiters for an HL7 message. These delimiters help the receiving application to determine the start and end of an HL7 message that uses Internet Protocol network as transport.

NABIDH: A health information exchange platform by the Dubai Health Authority that connects public and private healthcare facilities in Dubai to securely exchange trusted health information.

Representational State Transfer (REST): is an architectural style that is commonly adopted for building web-based application programming interfaces (APIs).

Simple Object Access Protocol (SOAP): is a messaging protocol for standardized exchanging of structured information in decentralized, distributed application environments.

ABBREVIATIONS

API	:	Application Programming Interfaces
CDA	:	Clinical Document Architecture
DHA	:	Dubai health Authority
EBXML	:	Electronic Business XML or e-business XML
FHIR	:	Fast Healthcare Interoperability Resources
HIS	:	Health Information System
HISHD	:	Health Informatics and Smart health Department
HL7	:	Health Level Seven
IHE	:	Integrating the Healthcare Enterprise
MHD	:	Mobile access to Health Documents
MLLP	:	Minimal Lower Layer Protocol
MRN	:	Medical Record Number
NCIRD	:	National Center of Immunization and Respiratory Diseases
PACS	:	Picture Archiving and Communication System
PDQm	:	Patient Demographics Query for Mobile
PDQ	:	Patient Demographics Query
PIX	:	Patient Identifier Cross-referencing
PIXm	:	Patient Identifier Cross-reference for Mobile Profile
REST	:	Representational State Transfer

SOAP	:	Simple Object Access Protocol
XCA	:	Cross-Community Access
XCPD	:	Cross-Community Patient Discovery
XDS.b	:	Cross-Enterprise Document Sharing
XDS-SD	:	Scanned Documents Integration Profile
XDS-I.b	:	Cross-enterprise Document Sharing for Imaging

1. BACKGROUND

Dubai Health Authority (DHA) is mandated by Local Law (6) of 2018 Concerning Dubai Health Authority and Local Law No. (14) Of 2021 on amending the local Law No. (6) of 2018 concerning the Dubai Health Authority to undertake several functions including, but not limited to Developing regulation, policy, standards, guidelines to improve and promote the growth and development of the health sector in the Emirate of Dubai.

The Standards for Interoperability and Data Exchange aims to fulfil the requirements for Health Information Systems (HIS); in order to position Dubai as a global medical destination by introducing a value-based, comprehensive, integrated and high-quality service delivery.

2. SCOPE

2.1. All DHA licensed health facilities.

3. PURPOSE

3.1. To ensure accurate and consistent patient information across different HIS, by standardizing the interoperability and data exchange in health sector in the Emirate of Dubai.

3.2. To assure the trusted and secured flow and exchange of information among Data Subjects/Patients, healthcare providers, funders and health regulators.

3.3. To safeguard the efficient flow and exchange of health information in HIS; and warrant efficient data analysis.

3.4. To support achieving better healthcare outcomes through facilitating data-driven decision-making process.

4. APPLICABILITY

4.1. DHA licensed health facilities.

5. STANDARD ONE: STANDARDIZING THE INTEROPERABILITY AND DATA EXCHANGE

5.1. All health facilities integrating with/or accessing to HIS must adhere to DHA regulations and the United Arab Emirates laws.

5.2. HL7v2 is the recommended standard to follow for accessing and submitting the data.

5.3. In addition to the HL7v2, HIS should support Fast Healthcare Interoperability Resources (FHIR) and Integrating the Healthcare Enterprise (IHE) messaging standard which are highly utilized in healthcare data interoperability.

5.4. Health Facilities should use the following standardized interoperability and data exchange standards based on the use case:

Standard	Name of the standard	Publisher
HL7 v2	Health Level Seven Version 2.x	HL7 International
HL7 v3	Health Level Seven Version 3	HL7 International

HL7 CDA R2	HL7 Clinical Document Architecture Release 2	HL7 International
HL7 FHIR R4	HL7 Fast Healthcare Interoperability Resources Release 4	HL7 International

6. STANDARD TWO: INTEGRATING THE HEALTHCARE ENTERPRISE PROFILES

Facilities can use these profiles to communicate with HIS:

6.1. **Patient Identifier Cross-referencing (PIX)**: is for the cross-referencing of patient identifiers from multiple Patient Identifier Domains. The patient demographic information received from different participating organizations will be used for referencing local Medical Record Number (MRN)'s of HIS.

6.2. **Patient Demographics Query (PDQ):** provides ways for HIS matching patients, based on user-defined search criteria, and retrieve patient's demographic information directly.

6.3. **Cross-Enterprise Document Sharing (XDS.b):** enables HIS to send/share granular clinical data, like allergies, immunizations, medications, problems, procedures, results, vital signs, social history, functional status, plan of care, assessment of plan and other clinical information.

6.4. **Scanned Documents Integration Profile (XDS-SD):** Clinical documents that are only available in binary file format like PDF and not granular like external referral letter, mental health notes, surgical notes, nurses notes, discharge summary, patient consent forms, etc., can be sent to his using this profile.

6.5. **Cross-enterprise Document Sharing for Imaging (XDS-I.b):** Using this profile radiology Images stored in HIS PACS (picture archiving and communication) system can be registered with HIS by sending metadata of the image and URL to access image remotely, for purpose of displaying external images in Image viewer.

6.6. **Cross-Community Access (XCA):** supports the tools to query and retrieve patient clinical data and documents held by other HIS.

6.7. **Cross-Community Patient Discovery (XCPD):** supports the means to locate HIS that hold patient relevant health data and the translation of patient identifiers across other HIS holding the same patient's data.

6.8. **Patient Demographics Query for Mobile (PDQm):** provides ways for HIS to query for a list of matching patients, based on user-defined search criteria, and retrieve patient's demographic information directly into the HIS using FHIR standard.

6.9. **Patient Identifier Cross-reference for Mobile Profile (PIXm)**: supports the lookup of cross-referenced patient identifiers from multiple Patient Identifier Domains using FHIR Standard.

7. STANDARD THREE: MOBILE ACCESS TO HEALTH DOCUMENTS

7.1. The Facility should send the clinical documents using below mentioned profiles:

IHE Profile	Transaction	Reference	Associated System	Standard	Protocol
PIX (Patient Identifier Cross Referencing)	Patient Identity Feed	ITI-8	HIS	HL7v2	MLLP (Minimal Lower Layer Protocol)
	PIX Query	ITI-9			
	PIX Update Notification	ITI-10			
PDQ (Patient Demographics Query)	Patient Demographics Query	ITI-21	HIS	HL7v2	MLLP
	Patient Demographics and Visit Query	ITI-22			
XCA (Cross-Community Access)	Cross Gateway Query	ITI-38	HIS	ebXML	SOAP (Simple Object Access Protocol)
	Cross Gateway Retrieve	ITI-39			
XDS (Cross-Enterprise Document Sharing)	Provider and Register Document Set-b	ITI-41	HIS	ebXML	SOAP
	Register Document Set	ITI-42			
	Retrieve Document Set	ITI-43			

	Register On-Demand Document Entry	ITI-61			
	Registry Stored Query	ITI-18			
	Patient Identity Feed	ITI-8		HL7v2	MLLP
XCPD (Cross-Community Patient Discovery)	Cross Gateway Patient Discovery	ITI-55	HIS	HL7v3	SOAP
	Patient Location Query	ITI-56			
PDQm (Patient Demographics Query for Mobile)	Mobile Patient Demographics Query	ITI-78	HIS	FHIR	REST (Representational State Transfer)
PIXm (Patient Identifier Cross-reference for Mobile)	Mobile Patient Cross-Reference Query	ITI-83	HIS	FHIR	REST
MHD (Mobile access to Health Documents)	Provide Document Bundle	ITI-65	HIS	FHIR	REST

8. STANDARD FOUR: FAST HEALTHCARE INTEROPERABILITY RESOURCES (FHIR) BASED INTERFACES

8.1. This standard supports health portals that provide FHIR gateway to handle all the FHIR resource based requests and responses.

8.2. FHIR Application Programming Interfaces (API) should be applied to support the request and responses in API standard.

Functional area	Application Programming Interface
Patient	Patient Registration Get Patient Details Patient Identifier Cross-reference Query
Encounter	Get Encounters Get Encounter Details
Allergies	Get Allergies Get Allergy Details
Condition	Get Conditions Get Condition Details
Procedure	Get Procedures Get Procedure Details Record Procedure Update a Procedure Remove a Procedure
Medications	Get Prescriptions Get Prescription Details Record Prescription

Immunizations	Get Immunizations Get Immunization Details
Observations	Get Observations Get Observation Details
Laboratory & Radiology Results	Get Results Get Result Details
Clinical Documents	Get Documents Get Document Details Send Clinical Document Get Document Collection Create Document Collection

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